**Magnet Activity Sequence**

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| **Key Ideas** | **Key Activities** |
| Different types of permanent magnets have differing strengths (not always related to size). | Use an assortment of different types of magnets to show strength is not related to size: frig magnets, business card magnets, rare earth magnets (super magnets from Office Depot, tiny but STRONG), Bucky Balls, magnetic blocks, etc. |
| A magnet attracts ferrous materials. Magnets attract some metals (iron, steel, nickel) but not others (aluminum, copper, gold). | What is a ferrous material? What does a magnet attract? Test various magnets with various types of materials. (iron, steel, nickel) but not others (aluminum, copper, gold). |
| Magnets can repel or attract (based on their orientation). | Magnet stacking activity Ben mentioned |
| The north pole of one magnet attracts the south pole of a second magnet, while the north pole of one magnet repels the other magnet's north pole. | Ben’s Stacking Activity |
| The end of a freely pivoted magnet will always point in the North-South direction. (how compasses work) | Use a compass in various parts of the school and see how it works to point North when facing different directions. |
| Earth is a giant permanent magnet with a north and south pole. | How the Aurora Works (2.23 mins.)  <https://vimeo.com/115851929>  Auroras: What Makes Them Happen—Exploratorium Site  <http://www.exploratorium.edu/learning_studio/auroras/happen.html>  Aurora Video Clips by Robert Schwarz (current South Pole winterover who is a physicist who used to work for Ice Cube neutrino project)  <https://vimeo.com/polarlights/videos>  Sun Shadow Project  Students can use compasses to detect direction of shadow (Sept 21, Dec 21, March 21) ties in some earth science |
| An electromagnet is a magnet that can be turned on off. | Build an electromagnet and test with various materials. Then compare it to strength of permanent magnet.  Magnets and Electromagnets from PhET Lab  <http://phet.colorado.edu/en/simulation/magnets-and-electromagnets>  Electricity, Magnets, and Circuits from PhET LAb  <http://phet.colorado.edu/en/simulations/category/physics/electricity-magnets-and-circuits> |
| The more electric current, the stronger the electromagnet. | Increase the strength of the current and compare the strength of the electromagnet now with more current to what it could attract with less current. |
| Motion depends on the orientation of a magnet. | Relate to Anchoring event/  Show Maglev Train video.  <https://www.youtube.com/watch?v=aIwbrZ4knpg>  Use magnets to demonstrate this concept. |